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Two new species of *Diacheopsis* from China[1]

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Abstract — Two new species from China in the myxomycete genus *Diacheopsis* are described and illustrated. The distinctive characteristics of *Diacheopsis griseobrunnea* sp. nov. are solitary and grayish brown sporocarps, sparse and uniform capillitium, and minutely warted spores; those of *Diacheopsis gigantospora* sp. nov. are large spores marked with long spines, a capillitium that forms a very loose network, and wide tubular threads. Differences between the new species and closely related taxa are discussed. Type specimens are deposited in the Microbial Cultures Center of Nanjing Normal University.

Key words —morphology, taxonomy

Introduction

The genus *Diacheopsis* (*Stemonitaceae*, *Stemonitida*) was established by Meylan in 1930 with *D. metallica* Meyl. as the type species (Kirk et al. 2008; Martin & Alexopoulos 1969). Sixteen species are currently known for the genus (Hernández-Crespo & Lado 2013), but only one species, *D. mitchellii*, has been collected from China (Yamamoto et al. 2002).

Among our examinations of a number of myxomycetes obtained from moist chamber cultures of bark samples from living trees, two specimens were found that appeared to fit the generic concept of *Diacheopsis*, in that they had sessile fruiting bodies and were limeless, non-columellate, and characterized by an iridescent peridium. As they also differed from any known species of *Diacheopsis*, they are described here as two new species.

Materials & methods

Moist chamber culture: In the laboratory, the bark samples from living trees were placed in artificial moist chambers. These chambers consisted of Petri dishes (9 cm in diam.) lined with moistened filter paper as described by Stephenson (1989).

[1] Shu-Zhen Yan and Ming-Quan Guo contributed equally to this paper.

The samples were moistened with distilled water, and excess water was poured off after approximately 24 h. The cultures were maintained under indirect natural light at room temperatures (23–25 °C). To maintain a moist environment, distilled water was added to the cultures when required. The cultures were examined under the stereomicroscope every 2 days. After 1–2 days when the myxomycete fruiting bodies were fully mature, they were removed from the moist chambers, air-dried, and placed into a small plastic specimen box for permanent preservation. All specimens examined are deposited in the Microbial Cultures Center of Nanjing Normal University (MCCNNU).

Morphological observations: The morphology was observed using a stereomicroscope (Jiangnan JSZ6, Nanjing, China), optical microscope (Nikon YS2–H, China and Zeiss Axio Imager A1, Göttingen, Germany), and scanning electron microscope (JEOL, JSM-5610LV and JSM-5900, Tokyo, Japan). For light microscopic observations, the preparation of slide mounts followed Martin & Alexopoulos (1969). For SEM study, the air-dried specimens with entire and broken sporocarps were attached to double-sided adhesive tape on sample holders of the scanning electron microscope, and coated with platinum-palladium using a JEOL JFC-1600 Auto Fine Coater.

Taxonomy

Diacheopsis griseobrunnea Shuang L. Chen, Shu Z. Yan & M.Q. Guo, **sp. nov.**

MycoBank MB 805456 Plate 1

Differs from *Diacheopsis depressa* by its solitary globose sporocarps, sparse capillitium not forming a network, and smaller spores.

Type: China, Guangxi: Shangsi County, Pingguang Forest Center, alt. 250 m, on bark of living *Pinus massoniana* Lamb. in moist chamber culture, collected 12 Jan. 2005, cultured 5 May 2005, harvested 22 May 2005, S.-Z. Yan & S.-L. Chen (**Holotype**, MCCNNU00151).

Etymology: Latin *griseus* (gray) and *brunneus* (brown), referring to the grayish brown sporocarps.

Fruiting bodies sessile and sporocarpous. Sporocarps solitary, grayish brown, iridescent with purple and metal reflections, globose or subglobose, the base constricted, 0.3–0.6 mm diam. Hypothallus dark brown, round, small, thin, membranous. Peridium persistent, thin, membranous, outer surface roughened with some irregular wrinkles. Columella absent. Capillitium sparse, connected to the base and the peridium, a few branched, threads slender, uniform, 1–1.5 μm in diam., smooth, subhyaline by transmitted light. Spore dark brown in mass, pale violaceous brown by transmitted light, densely marked with minute warts, globose, 6.5–8.0 μm diam. Plasmodium not observed.

Comments: *Diacheopsis griseobrunnea* is similar to *D. depressa* K.S. Thind & T.N. Lakh., *D. mitchellii* Nann.-Bremek. & Y. Yamam., *D. rigidifila* S.L. Stephenson & Nann.-Bremek., and *D. synspora* Nann.-Bremek. & Y. Yamam. in the nature of the capillitium which forms a few branches but not a network. However, *D. depressa* differs by its globose to subglobose to slightly elongated

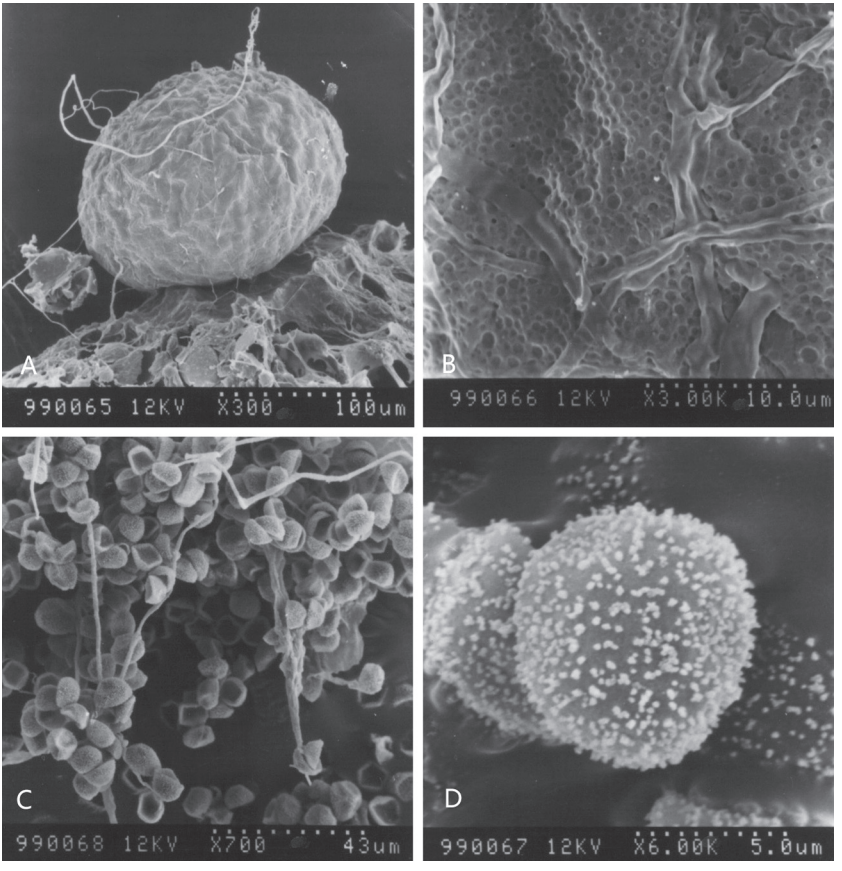

Plate 1. *Diacheopsis griseobrunnea*: A: Sporocarp; B. Portion of the outer peridium; C: Capillitium and spores; D: Spore.

angular sporocarps, its abundant capillitium, and its larger spores (9–12 μm diam.; Thind & Lakhanpal 1968); *D. mitchellii* has larger spores (18–23 μm diam.; Nannenga-Bremekamp & Yamamoto 1983); *D. rigidifila* has a capillitium with more or less fusiform thickenings in the central part (Stephenson & Nannenga-Bremekamp 1990); and *D. synspora* has spores united in stable clusters of 5–7 (Nannenga-Bremekamp & Yamamoto 1986).

Diacheopsis gigantospora Shuang L. Chen, M.Q. Guo & Shu Z. Yan, **sp. nov.** Plate 2
MycoBank MB 805455

Differs from *Diacheopsis mitchellii* by its very loose capillitial network, wider tubular capillitial threads, and larger spores.

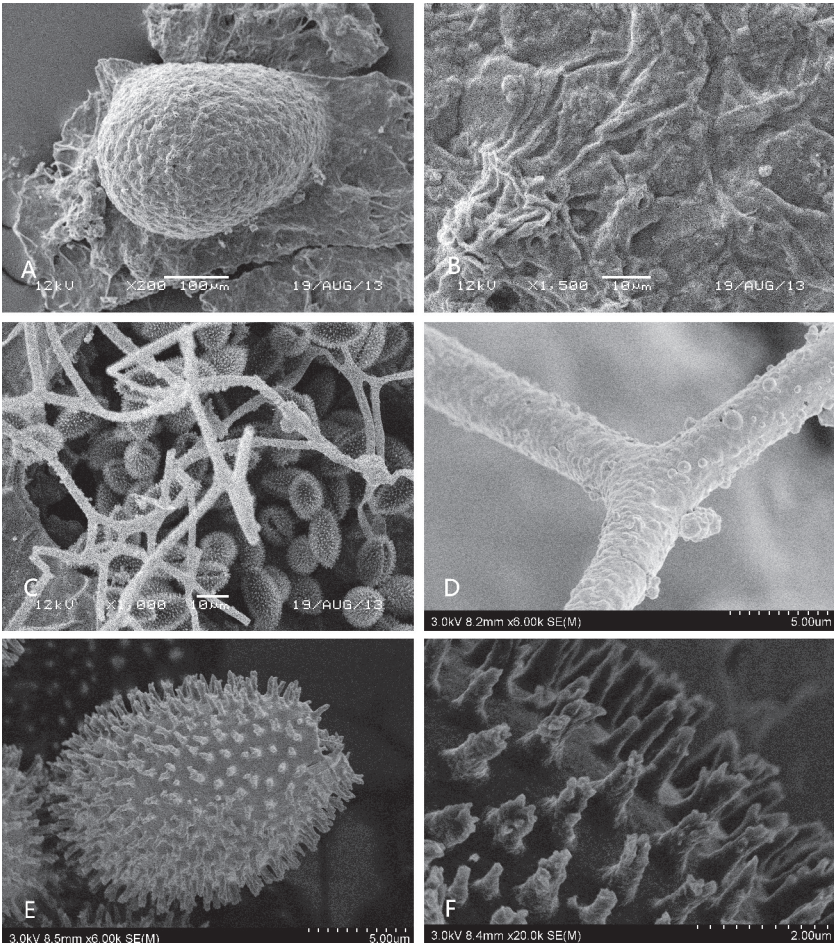

Plate 2. *Diacheopsis gigantospora*: A: Sporocarp; B. Portion of outer periduium; C: Portion of the capillitium net; D: Branched part of the capillitium; E: Spore; F: Part of a spore.

Type: China, Yunnan: Pingbian County, Dawei Mountain National Natural Reserve, alt. 1677 m, on bark of living *Cryptomeria japonica* (Thunb. ex L. f.) D. Don. in moist chamber culture, collected 23 Nov. 2012, cultured 24 Feb. 2013, observed 29 Mar. 2013, harvested 19 Apr. 2013, M.-Q. Guo & S.-L. Chen (**Holotype**, MCCNNU00706).

Etymology: Latin "*gigant-*" (gigantic) and "*sporus*" (spored), referring to the large spores.

Fruiting bodies sessile and sporocarpous. Sporocarps solitary, semi-globose to elongated, occasionally pulvinate, base wide, 0.1–0.2 mm in height, 0.3–0.5 mm in width, up to 0.7 mm in length. Sporocarps black at first, becoming dark

brown to dull black, iridescent with blue and purple reflections when maturing. Hypothallus dark brown, small, thin, membranous. Peridium persistent, thin, membranous, the outer surface mostly roughened but without any distinct ornamentation, the inner surface smooth. Columella absent. Capillitium sparsely branched and with few interconnections, forming a very loose network, threads white or pallid but limeless, straight, tubular, 2–5 μm in diam. and sometimes expanded at the junctions and marked with a few bead-like thickenings on the larger branch. Spores black in mass, dark brown to black brown by transmitted light, obviously marked with evenly-distributed spines up to over 1 μm long, globose, (17.5–)20.6–26.2(–28) μm diam. including spines. Plasmodium black.

Comments: *Diacheopsis* species having large spores include *D. insessa* (G. Lister) Ing (14–19 μm; Martin & Alexopoulos 1969), *D. kowalskii* Mar. Mey. & Poulain (15–18.5 μm; Meyer & Poulain 1998), and *D. mitchellii* (18–23 μm; Nannenga-Bremekamp & Yamamoto 1983). However, the spore sizes in these three species are smaller than those in *D. gigantospora*. In addition, *D. insessa* differs by its densely clustered sporocarps (sometimes with weak stalks) and a purplish capillitium; *D. kowalskii* has gregarious and pulvinate sporocarps, a bicolored capillitium, and flattened threads bearing darker axillary expansions; and *D. mitchellii* has sporocarps in small groups, capillitium of simple or sparsely dichotomous threads ca. 0.5 μm diam. and not forming a network, and spores densely covered with evenly-distributed nail-headed warts or blunt spines.

Several other species of *Diacheopsis* have wide capillitium threads, including *D. kowalskii*, *D. nannengae* G. Moreno et al., *D. pauxilla* Mar. Mey. & Poulain, *D. reticulospora* Mar. Mey. & Poulain, *D. serpula* Kowalski, and *D. synspora*. From *D. gigantospora*, *D. nannengae* differs by its larger sporocarps, brown capillitium, and smaller spores (Moreno et al. 1989); *D. pauxilla* by its gregarious and greater sporocarps, and smaller spores (Meyer & Poulain 1998); *D. reticulospora* by its plasmodiocarpous sporocarps, brown capillitium, and spores densely and irregularly reticulated (Meyer & Poulain 1990); *D. serpula* by its plasmodiocarpous sporocarps, purple-brown threads, and smaller spores (Meyer & Poulain 1998); and *D. synspora* by its gregarious and larger sporocarps, dichotomously branched capillitial threads and spores united in stable clusters of 5–7 (Nannenga-Bremekamp & Yamamoto 1986).

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